Optimizing Performance: Mental Skills Training to Make Average Performance Excellent

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Introductions
Lecture Objectives

1. ID barriers to healthcare providers’ performance
2. Discuss the rationale, benefits, and applications of mental skills training with providers
3. Discuss the development of our novel, comprehensive mental skills curriculum and results of its effectiveness with trainees
4. Practice skills from our curriculum
Group Breakout

• Consider times when stress positively/negatively impacted your performance (clinical, teaching, presentation, etc)
  – Sources of stress?
  – Effects on performance?
Cognitive Demands

• Surgeons, $^{1,2}$ Emergency Department Nurses and Physicians, $^{3}$ Anesthesiologists, $^{4}$ and other providers are required to:
  – Execute complex fine-motor skills
  – Sustain focus over long periods of time
  – Adapt to changing demands
  – Maintain sound clinical judgment
  – Effectively communicate

1. Arora et al. Surgery 2010
2. Maher et al. AJS 2013
Additional Demands for Novices

• Novices are learning skills and performing them in high-pressure evaluative situations

• Novices may be easily overwhelmed during clinical performance and are uncertain of how to cope with it\(^1\)

• When situational demands exceed one’s ability to manage them, the resulting response is cognitive overload and stress\(^5\)

1. Arora et al. Surgery 2010
5. Mayer & Moreno, Edu Psych 2003
Cognitive Stress Appraisal

• Stress response is the interaction of $^{4,5}$:
  – Physiological responses (arousal) to external stimuli
  – Cognitive appraisal of coping ability

• No inherent emotional component

• Perception/appraisal of external stimuli (ie, threat or challenge) and ability to cope with demands determine impact

Stress and Performance

Fig. 3: Hardy & Fazey's (1987) Catastrophe Model demonstrating the association between anxiety and performance.

The Body’s Reaction to Sympathetic Nervous System Activation

**BRAIN**
- Perceptual Narrowing
- Loss of Cognitive Processing
- Increased Reaction Time
- Hypervigilence

**EYES**
- Loss of Peripheral Vision (Tunnel Vision)
- Loss of Night Vision
- Loss of Depth Perception
- Impaired Near Vision

**ADRENAL GLAND**
- Release of Adrenaline
- Release of Noradrenaline

**HANDS**
- Loss of Fine Motor Skills
- Loss of Complex Motor Skills

**LIVER**
- Begins Breaking Down Glycogen for Energy

**HEART**
- Increased Heart Rate
- Increased Blood Pressure

**SKIN**
- Vessels Constrict (Cool and Clammy)

**SPLNE**
- Releases White Blood Cells and Platelets for Possible Injury

**LUNGS**
- Dilated Bronchioles
- Increased Respiratory Rate

ILLUSTRATION COURTESY NAR
WORKING MEMORY

A cognitive system that temporarily holds a limited amount of information in an active state so that it may be quickly accessed, integrated with other information, or otherwise manipulated.

9. Drew & Vogel Encyc of Neurons 2009
Cognitive Overload

“The processing demands exceeds the processing capacity”

5. Mayer & Moreno, 2003
Decreased Sensitivity to relevant information

10. Lavie, et. al J of Exp Psych 2004
11. Zanto & Gazzaley J of Neurosc 2009
Decreased WMC for Verbal Information

15. Beilock & Carr Psych Sci 2005
17. Wiley & Jarosz Psych of Learn and Mot 2012
Reflection

• What are your go-to strategies for managing stress during performance?

• How do these techniques benefit performance?
Mental Skills Definition

• Mental skills are trainable mental abilities that underpin successful learning and performance.18

• These psychological tools aim to help performers achieve their ideal mental state to consistently perform their best.19
  – Mental Imagery
  – Arousal Regulation Skills
  – Attention Management Skills
  – Goal Setting
  – Refocusing Strategies
  – Pre-performance routines

18. Livingstone, C. Dictionary of Sport and Exercise Science and Medicine
19. Williams, JM. Applied Sport Psychology 2010
Is Mental Skills Training Effective?

• Mental skills have been shown to improve performance of:
  – US Navy SEALS\textsuperscript{20}
  – Military pilots\textsuperscript{21}
  – Police special forces\textsuperscript{22}
  – Elite athletes\textsuperscript{23}

• Mental skills, while typically applied in isolation, have shown promise in surgery \textsuperscript{24,25}

• Comprehensive mental skills curricula have incremental benefits to performers\textsuperscript{22,23}

\textsuperscript{21} McCrory et al. Military Psychology 2013
\textsuperscript{22} Le Scanff, C, Taugis, J. J Applied Sport Psych 2002
\textsuperscript{23} Guenthner et al J Sport and Behavior 2010
\textsuperscript{24} Arora S et al Ann Surg. 2011
\textsuperscript{25} Louridas M et al. Br J Surg. 2015
Comprehensive Mental Skills Curriculum Development for Surgeons

- Collaborative work among
  - surgical educator
  - curriculum expert
  - performance psychologists with expertise in mental training
  - mental skills coach
  - instructional designer
  - video editor
  - study coordinator(s)

- Curriculum development process (Kern’s 6 steps)
Comprehensive Mental Skills Curriculum

- Comprised of video education modules, workbook and applied practice during simulation training (individually tailored)
  - Neurology of Focus
  - Mental Imagery (Practice or Rehearsal)
  - Goal Setting (Action Plans)
  - Energy Management (Relaxation)
  - Attention Management
  - Refocusing Strategies
  - Performance Routines
Evidence of Effectiveness

• Our evaluation of this curriculum so far has demonstrated:
  – Enhanced participants’ use of mental skills in performance situations and laparoscopic simulator performance\(^\text{26}\)
  – Reduced novices’ perceived stress during two validated stress tests\(^\text{27}\)
  – Improved surgical skill retention compared to controls\(^\text{28}\)
  – Mitigated complete performance collapse under heightened stress compared to controls\(^\text{29}\)

Energy Management

• Goal of these skills: manage physiological and mental states

• Can **rapidly** mitigate negative impact of over/under-arousal (very effective for acute stressful events in the OR)

• Recovery from over-arousal is more difficult, this will be our focus
Energy Management Skills

• Centered breathing/relaxation
  – Lowers physiology to optimal level
  – Centers attention and emotions to IPS
  – Can control breathing, which can counter adrenaline surge
Centered Breathing

1. Trigger Breath-
   - Deep breath
   - Pause
   - Push all air out rapidly and tighten diaphragm

2. Deep Breathing-
   - Inhale for 5 seconds Pause
   - Exhale for a slow 7 count

3. Focus-
   - ‘Park’ attention on target (e.g., counting out the rhythm)
   - Select and say cue word silently (e.g., “center” or “calm”)

4. Your turn!
Attention Management

MANAGING STRESS

“There is nothing good nor bad; but thinking makes it so.”

Event
Attention Management Techniques
Can be used to change the way you think

Emotions
Assessment of Ability to Handle Situation

Response
Relaxation Techniques
Can be used to change the way you feel
Cognitive Reframing

Retrain Your Brain
Believable Counters to Negative Thoughts

- Negative trance (cycle of negative self-talk)
- Need to break trance (trigger breath) and direct thoughts to optimize performance
- Cannot discount negative self-talk with a positive platitude
- It must be believable and realistic
I have to be at the board meeting in 30 minutes. I have to rush to get this lap chole finished before then! There’s no way I can do this in time!

Maybe, maybe not. Freaking out isn’t going to help. Take it one step at a time as smoothly and rapidly as possible and let’s see what happens.

Ascertain that the critical view is obtained appropriately (ie identify the cystic duct and artery, not mistaking them for the right hepatic or the common bile duct).
Cognitive Reframing

• Beware of these negative thought patterns:
  – All or nothing thinking
  – Personalizing blame
  – Catastrophizing
  – Selective pessimism

• Ask good questions of yourself to expose negative thoughts
### Rational Optimism - Cognitive Reframing

<table>
<thead>
<tr>
<th>Pessimism</th>
<th>Optimism</th>
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<tbody>
<tr>
<td>Stable “This always happens”</td>
<td>Unstable “This is a one-time event”</td>
</tr>
<tr>
<td>Global “I can’t do anything about this”</td>
<td>Specific “This happened for a specific reason that is modifiable”</td>
</tr>
<tr>
<td>Internal “It’s all my fault”</td>
<td>External “Things didn’t turn out so well because of circumstances that were beyond my control”</td>
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References

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